**Mitosis vs. Meiosis Comparison Assignment**

Ms. Ottolini, AP Biology

***Directions:*** *Create the charts for #1 and #2 on a separate sheet of paper and complete them thoroughly and accurately. You can fill in the information for Chart #3 on this page.*

1. What events occur during each phase of mitosis and meiosis? (You do not have to write the same thing twice, just say “see \_\_\_\_\_\_\_\_\_\_”

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Interphase | Prophase | Metaphase | Anaphase | Telophase / Cytokinesis |
| Mitosis | The cell grows and DNA is copied during the S phase. | Chromatin coils into chromosomes, nuclear membrane and nucleolus break down, and the mitotic spindle is built. | Spindle fibers attach to chromosomes and line them up single file at the center of the cell. | Chromatids separate and one chromatid (now called a daughter chromosome) is sent to each daughter cell. | Chromosomes uncoil into chromatin, nuclear membranes and nucleoli reform in daughter cells, and the mitotic spindle breaks down. |
| Meiosis I | Same as mitosis. | Same as mitosis, except homologous chromosomes pair up and cross over. | Spindle fibers attach to chromosomes and line them up in homologous pairs at the center of the cell. | Pairs of chromosomes separate and one chromosome (still X-shaped) is sent to each daughter cell. | Same as mitosis except the chromosomes may not fully uncoil before meiosis II. |
| Meiosis II | Note: this only occurs in some species, and if it does, there is no S phase. | Same as mitosis. | Same as mitosis. | Same as mitosis. | Same as mitosis. |

2.If the amount of DNA in a somatic cell equals X during G1 of interphase, how much DNA is present in the cell during each of the phases of mitosis and meiosis?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Interphase (after the S stage, if applicable) | Prophase | Metaphase | Anaphase | Telophase / Cytokinesis |
| Mitosis | Ex: 2X (during the S stage, DNA is replicated) | 2X | 2X | 2X | X (in each daughter cell) |
| Meiosis I | Ex: 2X (during the S stage, DNA is replicated) | 2X | 2X | 2X | X (in each daughter cell) |
| Meiosis II | X | X | X | X | 0.5X (in each daughter cell) |

3. Complete the chart below to identify the main differences between mitosis and meiosis.

|  |  |  |
| --- | --- | --- |
| **Difference** | **Mitosis** | **Meiosis** |
| 1. How many times does the original parent cell divide? (In other words, how many “rounds” of cell division take place?) | 1 | 2 |
| 2. How many daughter cells are created? | 2 | 4 |
| 3. Are the daughter cells diploid (2n) or haploid (n)? | Diploid | Haploid |
| 4. Are the daughter cells body cells (aka somatic cells) or sex cells (aka gametes)? | Body Cells | Gametes |
| 5. Are the daughter cells identical to each other and the parent cell or different? | Identical | Different |
| 6. Is this process used for growth, tissue repair, and asexual reproduction OR sexual reproduction? | Growth, tissue repair, and asexual reproduction | Sexual reproduction |